

## **AMENDMENTS TO THE CLAIMS**

### **Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in this application.

Claims 1-6 (Cancelled)

7. (Withdrawn) A system for direct digitally encoding a data signal for impulse radio communications, comprising:

an impulse radio transmitter having an encoder that direct digitally encodes the data signal to produce a direct digitally encoded data signal; and

an impulse radio receiver having a decoder and a phase-locked loop, wherein said direct digitally encoding avoids errors in the phase-locked loop.

8. (Withdrawn) The system of claim 7, wherein said encoder comprises a return-to-zero encoder.

9. (Withdrawn) The system of claim 7, wherein said encoder comprises one of a pseudo Manchester encoder, a frequency shift keying encoder, an n-ary phase modulation encoder and a phase amplitude modulation encoder.

10. (Withdrawn) An impulse radio receiver, comprising:

a cross correlator to cross correlate a received impulse radio signal with a decode signal to output a baseband signal;

a lowpass filter that uses the baseband signal to output an error signal;

an adjustable time base, responsive to the error signal, to control lock of the cross correlation; and

a subcarrier demodulator, responsive to the baseband signal, to output a demodulated information signal.

11. (Withdrawn) The impulse radio receiver according to claim 10, wherein the subcarrier demodulator is a direct digital demodulator.

12. (Withdrawn) The impulse radio receiver according to claim 11, wherein the direct digital demodulator comprises a pseudo Manchester decoder.

Claims 13-18 (Cancelled)

19. (Withdrawn) A method for receiving impulse radio signals, comprising:  
cross correlating a received impulse radio signal with a decode signal to output a baseband signal; demodulating the baseband signal to output a subcarrier signal;  
and  
demodulating the subcarrier signal to output an information signal.

20. (Withdrawn) The method according to claim 19, wherein said demodulating the baseband signal step comprises direct digitally demodulating the baseband signal to output the subcarrier signal.

21. (Withdrawn) The method according to claim 20, wherein said step of direct digitally demodulating further comprises pseudo Manchester decoding.

22. (Withdrawn) The method according to claim 19, further comprising:  
lowpass filtering the baseband signal to output an error signal; and adjusting a periodic timing signal using the error signal to time position the decode signal in relation to the position of the received impulse radio signal thereby optimizing the cross correlation.

23. (Currently amended) A transmitter, said transmitter comprising:  
(a) an output stage that generates an ultra wideband signal;  
(b) a filter that spectrally modifies said ultra wideband signal to create one or more zero crossings in the time domain; and

(c) an antenna coupled to said filter that radiates said spectrally modified ultra wideband signal.

24. (Previously presented) The transmitter of claim 23, wherein said ultra wideband signal comprises at least one of a pulse, a cycle, or a monocycle.

25. (Previously presented) The transmitter of claim 23, wherein said filter is a bandpass filter.

26. (Cancelled)

27. (Currently amended) The transmitter of claim 23, wherein said output ~~states~~ stage generates said ultra wideband signal based upon a trigger signal.

28. (Previously presented) The transmitter of claim 27, wherein said trigger signal is applied to at least one switch.

29. (Previously presented) The transmitter of claim 28, wherein said at least one switch comprises at least one transistor.

30. (Previously presented) The transmitter of claim 27, wherein said trigger signal is based on at least one of an information signal, a code signal, and a subcarrier signal.

31. (Currently amended) A method of transmitting, comprising:  
(a) generating an ultra wideband signal;  
(b) spectrally modifying the ultra wideband signal to create one or more zero crossing in the time domain; and  
(c) radiating the spectrally modified ultra wideband signal.

32. (Previously amended) The method of claim 31, wherein said ultra wideband signal comprises at least one of a pulse, a cycle, or a monocycle.

33. (Previously amended) The method of claim 31, wherein a filter is used to spectrally modify the ultra wideband signal.

34. (Previously amended) The method of claim 33, wherein said filter is a bandpass filter.

35. (Cancelled)

36. (Currently amended) The method of claim 31, wherein said generating ~~an~~ the ultra wideband signal is based on a trigger signal.

37. (Previously presented) The method of claim 36, wherein said trigger signal is applied to at least one switch.

38. (Previously presented) The method of claim 37, wherein said at least one switch comprises at least one transistor.

39. (Previously presented) The method of claim 36, wherein said trigger signal is based on at least one of an information signal, a code signal, and a subcarrier signal.

40. (Currently amended) A method of transmitting, comprising:  
    (a) generating an ultra wideband signal;  
    (b) filtering the ultra wideband signal to create one or more zero crossings in the time domain; and  
    (c) radiating the filtered ultra wideband signal.

41. (Currently amended) The method of claim 40, wherein said filtering is by a bandpass filter.

42. (Currently amended) The method of claim 40, wherein said generating ~~an~~ the ultra wideband signal is based on a trigger signal.